Federal University of Technology, Owerri
School of Health Technology
Department of Biomedical Technology
BMT 332: Biomedical Electronics II
Rain Semester Examination, 2011/2012
Section B (40 marks): Attempt Two Questions only. 40 mins

1(a) What is a Computer? (2 marks)
(b) List the three classes of Thermometers by their technology (3 marks)
(c) In a tabular form, compare & contrast Analog and Digital Electronics (5 marks)
(d) Briefly itemize the General Guidelines in Electrical Safety Testing(10 marks)

2(a) What is a thermometer? (2 marks)
(b) List three advantages of Digital Techniques (3 marks)
(c) In a tabular form, compare & contrast Invasive and Noninvasive BP measurement (5 marks)
(d) Briefly itemize using a Structured Approach steps you are likely to take in troubleshooting a named medical equipment; Give practical examples (10 marks)

3. (a) What is Oximetry? (2 marks)
(b) List the three subtypes of Computer memory (3 marks)
(c) In a tabular form, compare & contrast Primary and Secondary Thermometer (5 marks)
(d) i. Convert 110011 from binary to: 1. Decimal 2. Octal 3. hexadecimal
ii. Convert 479 from decimal to: 4. Octal 3. Hexadecimal (10 marks)

4. Write short notes on any two of the following:
(a) Electronic Stethoscope (10 marks)
(b) Digital Thermometer (10 marks)
(c) Pulse Oximeter (10 marks)

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Instruction: Attempt all Questions in Section A and Two Questions in Section B. 1hour 20 mins

Section A (40 marks)

Circle the letter A to E that best suits each Question. Time allowed for this section is 50minutes.

1. Digital electronics represent signals by discrete levels, which can be represented by 2 voltage levels: (a) zero and high (b) 1 and 2 (c) off and on (d) a and b (e) a and c .
2. Limitations of digital techniques is(are): (a) less circuits can be fabricated (b) more expensive (c) greater precision (d) a and b (e) b and c
3. Which of the following numerical system(s) has(have) F as one of the possible digits/symbols: (a) octal (b) decimal (c) hexadecimal (d) digital (e) b and d
4. 11011_2 is equivalent to: (a) 27_{10} (b) 33_8 (c) $1B_{16}$ (d) a and b (e) all
5. If $X = 1$ and $Y = 0$, then $F(X,Y)$ in an *AND* logic gate will be: (a) 0 (b) 1 (c) 2 (d) NOT (e) none
6. If $X = 1$ and $Y = 0$, then $F(X,Y)$ in an *OR* logic gate will be: (a) 0 (b) 1 (c) 2 (d) NOT (e) none 18. The
7. The following Boolean Law/Theorem (X')' = X is called: (a) Idempotency theorem (b) Complementarity (c) Involution theorem (d) Identity (e) b and c
8. The name "computer" was first used because computers were designed to: (a) for general purposes (b) do programming tasks (c) carry out a finite set of logical operations (d) carry out calculations (e) all
9. The storage location in the computer CPU is the: (a) Program counter (b) ALU (c) Status register (d) Datapath (e) Register file
10. A computer memory that is nonvolatile and in which same amount of time is required to access any location on the same chip is: (a) RAM (b) DRAM (c) ROM (d) a and b (e) none
11. A computer memory, which memory chip can be programmed by the end user is: (a) DRAM (b) SRAM (c) MROM (d) PROM (e) none
12. A computer memory which is both electrically programmable and erasable many times is (are): (a) EPROM (b) EEPROM (c) Flash Memory (d) a and b (e) b and c
13. A Computer program can be: (a)software (b)a sequence of instructions (c)a language (d) a and b (e) all
14. Which of these is (are) a software: (a)Source Code (b)Object Code (c)Cross assembler (d) all (d) none
15. Data, data direction, control, and status registers are classes of which of the following register(s): (a) CPU (b) I/O (c) Data (d) all (e) none
16. The register that always points to next instruction to be executed:(a)PC (b)Data (c)CPU (d)I/O (e)none
17. Principles of Thermometry include: (a) certain substances expand and contract when heated (b) some objects of slightly different densities would rise and fall when heat is applied to them (c) some initially cold objects got hotter when placed near another hot object (d) a and b (e) all
18. Thermometers based on the velocity of sound in a gas are known as: (a) secondary (b) audible (c) primary (d) a and b (e) none
19. Temperature systems are primarily: (a) thermal (b) electrical (c) mechanical (d) a and b (e) b and c
20. Medical thermometers can measure temperatures at the following body parts: (a) brachium (b) sub-lingual (c) sub-clavian (d) scalp (e) plantar.
21. Thermometers can be classified by technology into: (a)air-filled (b)manual (c)mercuric (d)all (e)none.
22. The traditional thermometer has the technology of: (a) air-filled (b)manual (c)mercuric (d)all (e)none.
23. Thermometers that may work by contact or remote sensing is of technology: (a) air-filled (b) manual (c) mercuric (d) all (e) none.
24. Remote sensing thermometers work by ___ sensors: (a) infrared (b) radar (c) UV (d) a and b (e) none
25. Stethoscope can be used to listen to the sound in the: (a) skull (b) veins (c) muscle (d) a and b (e) none

26. Stethoscope was developed: (a) by Laennec (b) a medical engineer (c) in Paris (d) a and c (e) a and b who wished to listen to an obese young lady's heart.
27. In noninvasive BP measurement, methods include(s): (a) sphygmomanometry (b) oscillometric (c) auscultatory (d) b and c (e) all
28. The BP cuff is wrapped round: (a) lower arm (b) upper forearm (c) lower forearm (d) all (e) none
29. The Oscillometric method of BP measurement uses: (a) sphygmomanometry (b) auscultatory method (c) pressure sensor (d) a and b (e) a and c
30. Types of Stethoscope include: (a) focal (b) stethophone (c) manual (d) b and c (e) none
31. Pinard's stethoscope is the following type: (a) focal (b) electronic (c) manual (d) all (e) none
32. Electronic stethoscopes require conversion of __waves to __ signals: (a) sound, electrical (b) sound, mechanical (c) electrical, sound (d) all (e) none
33. An electronic stethoscope can: (a) be a wireless device (b) be a recording device (c) provide both visual and audio output (d) a and b (e) all.
34. Electronic Stethoscope: (a) can use a software (b) can be used in telemedicine (c) can be used in remote diagnosis (d) a and b (e) all
35. Digital oscillometric BP monitors are not designed to be used in certain conditions such as: (a) bradycardia (b) tachypnea (c) arteriosclerosis (d) a and b (e) all
36. Features of the Digital sphygmomanometer exclude: (a) LCD display (b) manual quick exhaust valve (c) automatic cuff inflation and deflation (d) a and c (e) none
37. Pulse Oximetry: (a) invasive (b) displays pulse pressure (c) uses one light frequency (d) uses the plethysmographic pulse from the artery (e) all
38. Medical equipment designed with switching power supplies indicates that: (a) the supplies can handle either 50 Hz or 60 Hz without the need for conversion (b) the medical device have a motor in it (c) the supplies can handle either 50 Hz or 60 Hz but needs conversion (d) a and b (e) none
39. User error cannot be: (a) language (b) incorrect programming (c) incorrect settings (d) misunderstanding of what the equipment is capable of doing (e) none.
40.A structured approach to troubleshooting helps avoid: (a)mistakes (b)redisign (c)errors (d) a & c (e)all